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# Initial endowments and economic reform in 27 post-socialist countries

Ariel BenYishay, Pauline Grosjean *

*School of Economics, University of New South Wales, 2052 Sydney, Australia*

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ABSTRACT

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This study explores how initial endowments at the start of transition have shaped reform outcomes and reform trajectories in 27 former communist countries in Europe and Central Asia. Countries of the former Russian Empire that had a large resources sector at the start of transition underperformed other countries in terms of the speed and the depth of economic reforms. The effect is particularly strong for privatization, enterprise restructuring and competition policy. Within country, Ottoman or Russian provinces that had a large natural resources sector in 1989 have a lower share of entrepreneurs and of small and medium sized enterprises today and also experience endemic corruption. Our results indicate that the propensity, or ability, of special interest groups to capture the reform process that would erode their rents were facilitated by the quality of institutions whose foundations go back centuries; and that the effects on the local economy are real. *Journal of Comparative Economics* **xxx** (xx) (2014) xxx–xxx. School of Economics, University of New South Wales, 2052 Sydney, Australia.

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## 1. Introduction

The track records of economic development and institutional reform vary greatly across transition countries. Such diversity in fortunes was first attributed, at the start of the transition, to the kind—and particularly the speed—of economic reforms. Since then, the persistence of differences in transition among countries has shifted the focus toward the role played by longer-lived institutions. Recent research has highlighted the variation across countries in the institutional determinants of growth and democratization, such as the quality of governance and the security of property rights, as well as social capital and social norms.[1] To explain such differences, and address the shortcoming that poor institutions and poor economy policy choices may be the cause as much as the effect of poor economic performance, research has highlighted the institutional legacy

* Corresponding author.
*E-mail address:* p.grosjean@unsw.edu.au (P. Grosjean).

[1] The literature is too voluminous to be reflected in an adequate fashion here. On governance, see LaPorta et al. (2008) for a review of the literature on legal origins, and Berglöf and Claessens (2006) for an application to transition countries. On the security of property rights, see namely Acemoglu and Johnson (2005). Djankov et al. (2003) highlight the crucial tension between a state strong enough to enforce property rights and curb disorder but not too strong so as to become itself the main threat to property rights. For reviews on the importance of social capital and social norms: Guiso et al. (2006) and Nunn (2012).

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Source: LITS, EBRD

**Fig. 1.** Standardized transition indicators across (top panel) and within former empires (bottom panel). *Source*: LITS, EBRD.

of former empires.[2] Dimitrova-Grajzl (2007) shows that Habsburg successor states have more economically efficient institutions than Ottoman successor states. Grosjean (2011a, 2011b) has found negative and persistent effects of Ottoman rule in South-Eastern Europe on financial development and social norms of trust, while Becker et al. (2011), highlight the contrasting, positive legacy of Habsburg rule on (the lack of) corruption. Grosfeld and Zhuravskaya (2013) show that areas of Poland that were under Prussian or Austrian rule vote for more liberal parties today compared with former lands of the Russian Empire. Differences in the transition experience among countries ruled by differing empires are stark: the top panel of Fig. 1 displays the wide heterogeneity in standardized EBRD transition indicators across former empires.

However, history is not the whole story. Even within the boundaries of former empires, the diversity of countries' experiences is considerable, as illustrated in the bottom panel of Fig. 1. To take one example, the Baltic states and Georgia are at the top of the charts in terms of economic and political reforms while other former members of the USSR and the Russian Empire, such as Kazakhstan and Belarus are lagging behind most other former communist countries.

[2] Legal origins is a particular dimension of initial institutions that has attracted a large literature. See LaPorta et al. (2008) for a review of this literature.

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What can explain such within-empire differences in transition? In a seminal paper, Engerman and Sokoloff (1997) argue that initial factors endowments—initial conditions in terms of distribution of wealth, labor, and natural resources—have a profound impact on long-run economic and political development. In the case of the post-transition region as a whole, it could be argued that not only natural resources endowment but also decades of central planning have determined the concentration of economic power that countries inherited at the start of transition. It is then natural to ask to what extent such pre-transition endowments influenced the subsequent transition process and reform outcomes. This issue is particularly relevant in the natural resources sector, in which rent seeking associated with easy revenue windfalls erodes the quality of institutions, a phenomenon labeled the "political resource curse" (Brollo et al., 2013). However, the literature has shown that whether natural resources are a "curse" or a "blessing" depends on the quality of initial political institutions (Mehlum et al., 2006). In settings with strong initial institutions, the expansion of natural resources may further strengthen these institutions; deterioration is more likely when the existing institutions are weak at the outset. To return to our earlier examples, in the former Russian empire—where Grosfeld and Zhuravskaya (2013) show initial institutions were weaker than those of the Prussian or Austrian empires—Georgia and the Baltic states are the most resource poor nations but best performing in their transitions; Kazakhstan and Belarus are both resource rich but lag in their reforms.

We explore in this paper the extent to which initial endowments at the beginning of transition have shaped reform outcomes and reform trajectories. By initial endowments, we refer both to institutional endowments, inherited from the political history of the region, and economic endowments, which consist of the distribution of the natural resources sector at the start of transition.

Our analysis rests upon both cross- and within-country analyses in 27 post-transition economies. We proxy institutional endowments by the long-run political history of each country and sub-national region. A fascinating feature of the region under study is that the boundaries of pre-WWI Empires do not necessarily correspond to national borders in nine countries of our sample, which were divided between different empires.[3] We are thus able to capture, in the second part of the analysis, some variation in institutional endowments within country. To capture the concentration of rents at the start of transition, we use regional employment shares in the natural resource and mining sector in 1989. This data is obtained from a large-scale, nationally representative individual survey conducted by the EBRD and the World Bank in 2006, the Life in Transition Survey. In a subsample of countries for which data is available, we verify the reliability of such self-reported retrospective data on employment with secondary data on natural resources reserves. Across countries, we compare how such institutional and economic initial endowments have shaped country-specific progress in economic reforms, which we capture by EBRD's transition indicators. Within-country, our dependent variable consists of micro-level data on the 'real' success of economic transition used in Grosjean and Senik (2011): the share of entrepreneurs, and of newly created (since 1989), and small and medium sized enterprises in the local economy. We measure the (lack of) success of political transition by the prevalence of corruption in local public services. Both measures are from the Life in Transition Survey.

Our empirical results indicate that the concentration in the sector of natural resource and mining in 1989, per se, is not significantly associated with transition scores today. However, it slowed progress in the former Russian Empire and in the former Ottoman Empire, although to a lesser extent. On average, the effect of going from zero to the sample mean concentration in natural resources and mining in 1989, combined with Russian heritage, is equivalent to the difference in transition scores today between Serbia and Hungary, or Uzbekistan and the Russian Federation. The effects are particularly string and robust for large-scale privatization, enterprise restructuring and competition policy. Moreover, the negative average association between Russian legacy and transition outcomes today is entirely explained by the initial distribution of the mineral resource sector. In other words, former parts of the Russian Empire do not perform less well than the rest of the transition region in terms of reforms, but areas of the former Russian Empire that also had a sizeable mineral resource sector in 1989 do. We also observe that much of this pattern set in at the start of the transition. It is already apparent in the early to mid-1990s, and has not changed much since.

To validate the cross-country estimates, and shed light on the real effects of reforms on local economies, we then turn to within-country regressions that make use of individual-level data and allow us to control for country fixed effects, thereby addressing concerns about selection and omitted variables at the country level. We obtain similar results. Natural resource endowment in 1989 is strongly and negatively associated with the share of entrepreneurs and newly created small and medium sized enterprises in the local economy in former Ottoman and Russian provinces of a given country, compared with former Habsburg or Prussian regions. It is strongly and positively associated with the prevalence of corruption in those regions, although the effect is statistically significant only in former Russian regions. At the sample mean, the share of the natural resources sector in 1989 is associated with a nearly 3% lower share of small and medium sized enterprises and entrepreneurs today in former Ottoman regions, and a 2% lower share in former Russian regions, compared with other regions. It is also associated with a 13% higher prevalence of corruption in the former Russian regions.

The idea that the concentration of economic power can shape political outcomes is not novel, and particularly in the region under investigation. For example, the failure of early privatizations is often attributed to the capture of the political process by special interest groups, which opposed the reforms that would erode their rents. Yet our results suggest that their propensity and ability to oppose such reforms have depended on the quality of contemporary economic institutions whose foundations go back centuries.

[3] Croatia, Hungary, Lithuania, Montenegro, Poland, Romania, the Russian Federation, Serbia, and Ukraine.

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**Table 1A**
Descriptive statistics: dependent variables. *Source*: EBRD, Grosjean and Senik (2011), LITS.

| Country | *Z*-score transition 1990 | *Z*-score transition 2000 | *Z*-score transition 2010 | Market development | Corruption |
|---|---|---|---|---|---|
| Albania | −3.06 | −0.08 | 0.74 | 2.46 | 18.07 |
| Armenia | −3.06 | −1.68 | 1.22 | 2.49 | 13.63 |
| Azerbaijan | −3.06 | −4.20 | −4.53 | 2.17 | 14.01 |
| Belarus | −3.06 | −13.41 | −13.55 | 2.24 | 11.94 |
| Bosnia | 3.07 | −7.88 | −4.02 | 2.62 | 12.64 |
| Bulgaria | −1.44 | 3.10 | 3.47 | 2.91 | 14.97 |
| Croatia | 3.07 | 4.65 | 2.64 | 2.73 | 10.98 |
| Czech Rep | −3.06 | 9.08 | | 2.99 | 11.89 |
| Estonia | −1.97 | 8.99 | 6.88 | 3.07 | 8.97 |
| Fyrom | 3.07 | 0.96 | 1.22 | 2.59 | 15.28 |
| Georgia | −3.06 | 1.33 | 1.22 | 2.29 | 10.57 |
| Hungary | 10.41 | 11.47 | 6.88 | 2.76 | 11.61 |
| Kazakhstan | −3.06 | 0.30 | −2.75 | 2.74 | 13.23 |
| Kyrgyzstan | −3.06 | 0.97 | 0.25 | 2.35 | 16.07 |
| Latvia | −3.06 | 4.83 | 4.63 | 3.08 | 9.95 |
| Lithuania | −1.97 | 5.48 | 5.11 | 3.03 | 11.59 |
| Moldova | −3.06 | −0.59 | −1.25 | 2.49 | 14.81 |
| Montenegro | 3.07 | −11.90 | −2.44 | 2.50 | 12.32 |
| Poland | 24.73 | 8.69 | 6.40 | 2.69 | 10.57 |
| Romania | −3.06 | 1.92 | 2.31 | 2.90 | 13.38 |
| Russian Fed. | −3.06 | −1.46 | −2.46 | 2.75 | 14.22 |
| Serbia | 3.07 | −15.82 | −2.44 | 2.61 | 11.56 |
| Slovak Rep. | −3.06 | 7.19 | 6.24 | 2.87 | 13.40 |
| Slovenia | 6.95 | 5.74 | 2.16 | 2.67 | 10.22 |
| Tajikistan | −3.06 | −6.19 | −5.03 | 2.40 | 15.24 |
| Ukraine | −3.06 | −1.71 | −1.28 | 2.63 | 17.63 |
| Uzbekistan | −3.06 | −8.04 | −12.39 | 2.46 | 16.02 |

This paper is organized as follows: we review the related literature and our contributions in Section 2, followed by a description of our data in Section 3. We lay out our empirical methodology in Section 4 and describe our results in Section 5. We offer concluding remarks and implications for policy in Section 6.

## 2. Literature review

A literature before us has studied the interaction of geographic and by institutional factors in shaping economic and political development in different regions. Engerman and Sokoloff (1997) argue that initial factors endowments in wealth, labor, and natural resources have a profound impact on long-run economic and political development in the Americas through their influence on institutional design. Acemoglu et al. (2001, 2002), studying European colonies, argue that better institutions were more likely to be established in areas that had a disease environment less deadly to Europeans and poorer geographic endowments. Because rents generated by mineral and natural resources are more easily captured by political elites due to their observability, the literature has focused more particularly on the role played by natural resources endowment on economic and political performance. The deleterious effect natural resources can have on institutional quality and economic growth is conditional on the quality of political institutions.

Karl (1997) was an early proponent of the view that natural resources discovery is worse for a country that has not yet developed its institutions. Mehlum et al. (2006) provide supportive empirical evidence and shows that the effect of resources on development outcomes is conditional on the quality of institutions. This, in turn, explains the poor performance of many resource rich countries (Sachs and Warner (2001). While natural resources hurt countries with poor institutions, they help others. Wright's (1990) central hypothesis is that natural resources played an essential positive role for the growth in industrial exports in the United States. Recent literature has focused on the direct negative effect of resource windfalls on the quality of political institutions. Several mechanisms have been described, such as rent seeking (Velasco, 1999), patronage politics (Robinson et al., 2006), vote buying and repression (Caselli and Tesei, 2011), the delaying of reforms (Amin and Djankov, 2009), violence: either political (Ross, 2006) or interpersonal (Couttenier et al., 2013), as well as adverse effects on the quality and honesty of politicians (Brollo et al., 2013).[4] Again, this "political resource curse" is worse where initial institutional quality was worse to start with. For example, Caselli and Tesei (2011) find that resource windfalls accentuate autocracy in autocracies but have no effect in democracies. A possible interpretation is provided by Djankov et al. (2003), who highlight the crucial tension between establishing a state strong enough to enforce property rights and enable the exploitation of natural resources while avoiding disorder but not too strong so as to become in itself the main threat to property rights. In the context

[4] Torvik (2009) provides a partial review of this literature.

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of transition and unstable institutions, and when rents created by natural resource become entrenched, such a trade off may be more difficult to reach and countries might become stuck either in anarchy or in autocracy.

One of the difficulties of the literature is to isolate exogenous sources of variation in the quality of political institutions, which are independent of natural resource endowments and not directly caused by current economic and political performance. To overcome this the literature has turned to the long-run determinants of political quality, which is found in distant events in political history. In a seminal paper, Acemoglu et al. (2001) use colonial history as an instrumental variable for the quality of contemporary institutions. The region that we investigate in this paper is particularly well suited to such an approach, because of the diversity and variation in its political history.

We consider the political history of the region since the beginning of the XIVth century. From that time and until the First World War, it was split between a few empires (the Ottoman Empire, the Austro Hungarian Empire, Prussia and the Russian Empire) with considerable variation in their geographical extent. Moreover, most successor states borders do not coincide with former empires' borders. This is key to obtaining within country variation and distinguishing the legacy of history from the effect of current institutions.

The legacy of pre World War I Empires on current economic, social, and political outcomes is sizeable. Dimitrova-Grajzl (2007) shows that it is a key determinant of institutional quality, and that the Habsburg successor states have institutions that are more efficient in a market economy compared with Ottoman successor states. Grosjean (2011a, 2011b) found negative and persistent effects of Ottoman rule in South-Eastern Europe on financial development and social norms of trust, while Becker et al. (2011), highlight the contrasting, positive legacy of Habsburg rule on (the lack of) corruption. Grosfeld and Zhuravskaya (2013) show that areas of Poland that were under Prussian or Austrian rule vote for more liberal parties today compared with former lands of the Russian Empire. The legacy of former empires is explained partly because formal institutions are persistent over time, and because long lasting historical events shape social norms, which get transmitted to subsequent generations. Castañeda Dower and Markevich (2014, in this Volume) illustrate more directly the persistence of social norms by showing the continuity of anti-privatization sentiments in Russia over more than a century, from the 1906 Stolypin land reform to the present day.

## 3. Data

### 3.1. EBRD transition indicators

EBRD's transition indicators rate countries' progresses in economic reform along several dimensions, such as large scale privatization, small-scale privatization, governance and enterprise restructuring, price liberalization, trade and foreign exchange system, competition policy, banking reform and interest rate liberalization, and securities markets and non-bank financial institutions. Each index takes value from 1, indicating little to no progress, to 4, indicating standards and performance norms similar to those of advanced industrial economies. They are available yearly from 1990 to 2010 for each transition economy.

We are interested in the individual categories of the transition indicators but we also want to build an aggregate indicator of economic reform that reflects all these multiple outcomes. To this end, we adopt the z-score methodology used namely by Kling et al. (2007). We standardize each score by subtracting the mean and dividing by the standard deviation and we build a summary transition indicator by adding all transition standardized scores for each year. The first three columns of Table 1 present the average z-score in 1990, 2000 and 2010 for each available country in the sample.[5]

### 3.2. Micro-level data on market development, corruption, and pre-transition industrial shares

Our micro-level data on local market development, corruption and pre-transition industrial shares are from the Life in Transition Survey (LITS), a large-scale, nationally representative survey conducted by the European Bank for Reconstruction and Development and the World Bank in 28 post-transition countries. Respondents to the survey were drawn randomly, using a two stage sampling method, with census enumeration areas as Primary Sampling Units (PSUs), and households as secondary sampling units. LITS was undertaken in 2006 and in 2011. We rely on the 2006 dataset because it includes more detailed questions on employment histories. We drop Mongolia from our sample, since it has joined EBRD much later than other countries and transition indicators are not available for the whole period. This leaves us with a total of 27,000 observations.

To directly measure the success of the transition process, we use the index of local market development developed by Grosjean and Senik (2011). It consists of the regional proportion of respondents in the active labor force who are self-employed with more than five employees, or have a formal labor contract and either: work in a small enterprise, work in a medium enterprise, work in a private firm, or work in a newly created enterprise (since 1989). This measure is built using LITS questions about the respondents' first, second and third jobs. It is intended to capture the real effects of the success of transition at the local level. In areas that are more advanced in the transition to a market economy, the local share of small and medium sized enterprises and the share of entrepreneurs in the formal economy are expected to be higher. This index

[5] Some countries 'graduated' from EBRD in between the two time periods so that the transition indicators are no longer available for these countries.

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**Table 1B**
Descriptive statistics: independent variables. *Source*: LITS, Euratlas (2003).

| Country | Natural resources and mining 1989 | Prussia | Habsburg | Ottoman | Russia |
|---|---|---|---|---|---|
| Albania | 3.30 | 0 | 0 | 1 | 0 |
| Armenia | 3.10 | 0 | 0 | 0 | 1 |
| Azerbaijan | 3.80 | 0 | 0 | 0 | 1 |
| Belarus | 8.10 | 0 | 0 | 0 | 1 |
| Bosnia | 4.30 | 0 | 1 | 1 | 0 |
| Bulgaria | 4.40 | 0 | 0 | 1 | 0 |
| Croatia | 3.30 | 0 | 1 | 0.2 | 0 |
| Czech Rep | 5.90 | 0 | 1 | 0 | 0 |
| Estonia | 3.40 | 1 | 0 | 0 | 1 |
| Fyrom | 4.10 | 0 | 0 | 1 | 0 |
| Georgia | 2.10 | 0 | 0 | 0 | 1 |
| Hungary | 8.20 | 0 | 1 | 0.32 | 0 |
| Kazakhstan | 9.70 | 0 | 0 | 0 | 1 |
| Kyrgyzstan | 5.30 | 0 | 0 | 0 | 1 |
| Latvia | 2.40 | 1 | 0 | 0 | 1 |
| Lithuania | 1.50 | 0.06 | 0 | 0 | 0.94 |
| Moldova | 6.00 | 0 | 0 | 1 | 1 |
| Montenegro | 3.90 | 0 | 0 | 0.6 | 0 |
| Poland | 7.00 | 0.42 | 0.34 | 0 | 0.36 |
| Romania | 14.70 | 0 | 0.4 | 1 | 0 |
| Russian Fed. | 6.40 | 0.02 | 0 | 0 | 0.98 |
| Serbia | 5.10 | 0 | 0.58 | 1 | 0 |
| Slovak Rep. | 4.80 | 0 | 1 | 0 | 0 |
| Slovenia | 3.80 | 0 | 1 | 0 | 0 |
| Tajikistan | 4.30 | 0 | 0 | 0 | 1 |
| Ukraine | 8.10 | 0 | 0.14 | 0.28 | 0.88 |
| Uzbekistan | 3.10 | 0 | 0 | 0 | 1 |

varies from 0 to 5 with an average of 2.37. It is highest, on average, in Latvia (2.78), followed by the two other Baltic States, and is lowest in Azerbaijan (1.90) and Belarus (1.92). Grosjean and Senik (2011) provide several tests of the validity of this index. In particular, they verify that it is well correlated with the transition indicators at the national level (correlation coefficient of 0.77). The last column of Table 1 displays the country averages of this market development index.

To measure corruption, LITS asks: "In your opinion, how often is it necessary for people like you to have to make unofficial payments/gifts in these situations?". Eight situations are then listed, including obtaining legal documents, going to court for civil matters, interacting with the police, receiving healthcare or education, and requesting unemployment or other social security benefits. The five-point categorical answer scale ranges from never over seldom, sometimes, and usually to always.[6] Our variable "corruption" sums responses over the eight categories. It thus takes the value 0 if respondents answer that payments are "never" necessary in all eight situations, and the value 40 if respondents answer that payments are "always" necessary in all eight situations. It is lowest on average in Estonia (8.96) and highest in Albania (18.07). The fourth column of Table 1 displays all country averages.

The 2006 wave of the LITS also contained an entire section aimed at reconstructing respondents' life trajectories since the beginning of transition. Individual recall was stimulated by prompting respondents to remember fundamental events in their lives, such as getting married, or having children. Then respondents were asked to reconstruct their professional history, starting in 1989. Such a recall methodology has been used elsewhere with success, namely in McIntosh et al. (2011). In particular, respondents were asked whether they worked in 1989 (and every year thereafter until 2006), in what occupation and industry, as well as the type of ownership of the company they worked for (private, state, foreign). We focus on the share of people employed in the mining and natural resources sector in 1989 as a proxy the concentration of rents at the start of transition. On average, the regional share of the natural resources sector in employment was 5.2% across the whole region in 1989. It is highest in Romania (14.7%) and Kazakhstan (9.7%) and lowest in Lithuania (1.5%). The fifth column of Table 1 displays the shares by country. The rationale for focusing on this sector is that rents from the mineral and natural resources sector are easy to capture, as explained in Section 2.

To test the validity of such self-reported data, we cross-validate with data from the Mineral Resource Database System by the US Geological Survey. This dataset contains information on all sites with metallic and nonmetallic mineral resources, excluding oil and gas. All but one (Estonia) of our 27 countries have deposits and are included. The average shares computed from LITS at the national level correlate well with the number of large deposits per capita (correlation coefficient of 0.3) and with whether resource extraction is operated in a plant (correlation coefficient of 0.4).

[6] This question has been used namely by Becker et al. (2011), which reports a correlation coefficient of 0.49, statistically significant at the 5% level with the Corruption Perceptions Index 2006 of Transparency International (2007).

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### 3.3. Political history

We rely on Grosjean (2011a), who used the Periodical Atlas of Europe (Euratlas, 2003) to code the political history of each PSU in LITS, from 1300, the start date of empire consolidation in Medieval Europe, to 2000. The Ottoman Empire's territorial extension in South-Eastern Europe occurred mainly in the XIVth Century (Bulgaria, South Serbia, FYROM) and the XVth century (Albania, Bosnia and Herzegovina, Crimea, Moldavia, Wallachia and Montenegro). Territorial losses of the Ottoman Empire occurred chiefly in two waves: at the end of the XIXth century, namely after the Russian-Turkish War of 1877–1878, and at the eve of the first World War, after the Balkan Wars of 1911–1912. We designate by 'Habsburg Empire' what was the Kingdom of Hungary and the Austrian Empire and became the Austria-Hungarian Empire after the 1867 Ausgleich. Successor states, which became independent after the Saint-Germain and Sevres treaties of 1918, include territories that now belong to Croatia, Hungary, the Czech Republic, Poland, Romania, the Slovak Republic, Slovenia, Serbia and Ukraine. 'Prussia' designates Prussia per se (1525–1947) as well as Old Prussia (the Teutonic Order). Prussia encompassed territories that became part of today's Poland, Lithuania and Russia after the Treaty of Versailles in 1919. The Russian Empire's territorial expansion in Europe occurred mainly under Peter the Great in the XVIIth century and Catherine the Great in the XVIIIth century. Bessarabia was gained from the Ottomans in 1812. The Russian Empire encompassed more or less the Soviet Union, with the addition of some Polish territories, Turkish territories, but a much smaller Ukraine, not all territories of the Baltic states and without Kaliningrad.

The last four columns of Table 1 display the shares of each country that were under the different Empires. To perform the cross-country analysis, we code each country as belonging to an Empire if at least 50% of its territory was included.

## 4. Empirical strategy

### 4.1. Cross-country regressions

Our primary focus is on the heterogeneous response of transition to natural resources based on historical institutional quality. To test for such a response, we employ the following cross-sectional specification:

$$Transition_i = \beta_0 + \beta_1 Russian_i + \beta_2 Ottoman_i + \beta_3 NatRes_i + \beta_4 Russian_i * NatRes_i + \beta_5 Ottoman_i * NatResi + \varepsilon_i \quad (1)$$

where $Transition_i$ is the EBRD average z-score for country $i$, $Russian_i$ and $Ottoman_i$ indicate the country's historical empire, and $NatRes_i$ is the country's share of employment in the natural resource and mining sector in 1989. The reference empire is Habsburg ($\beta_3$ thus captures the effect of natural resources in former Habsburg countries).

We estimate this specification via OLS, with identification based on the exogeneity of natural resource shares pre-transition. We test the null hypotheses that $\beta_4 = 0$ and $\beta_s = 0$, e.g., that the effects of natural resources in former Russian and Ottoman countries are different than those in Habsburg countries.

This approach assumes that a country's economic structure around the extraction of natural resources as of 1989 was not affected by the subsequent transition experience. It further assumes that the employment shares in natural resources and mining in 1989 were not correlated with omitted factors that were themselves correlated with the subsequent transition. Below, we relax these assumptions by employing within-country estimation.

The effects of endowments in the natural resource and mining sectors may depend on existing institutions because the rents from these endowments tend to be concentrated. The protection of these concentrated rents can be accomplished most directly through direct control of the enterprises extracting them. Thus, we expect that the extent of natural resources should most directly affect the willingness (or lack thereof) of leaders to engage in large privatizations and to alter (or not) enterprise structure and governance. Similarly, leaders' willingness to allow competitive entry into these sectors (or liberalize competition policy more broadly) likely depends on the magnitude of rents from natural resources. At the same time, natural resources will less directly affect leaders' control over prices, foreign exchange, and the financial sector.

To test for the existence of such a mechanism, we assess whether the heterogeneous response of natural resources across historical empires differentially affects the EBRD Transition Indicators linked to these concepts. To do so, we estimate Eq. (1) for each of the seven transition indicators, testing $\beta_4 = 0$ and $\beta_s = 0$ for each of these specifications.

As previously noted, early experiences in the transition period may lead to persistent differences in countries' transition trajectories. We make use of the time coverage of the EBRD Transition Indicators to test for the presence of such persistence. To do so, we employ the following specification

$$\Delta Transition_{ijt,t+5} = \beta_{0j} + \beta_{1j} Russian_i + \beta_{2j} Ott_i + \beta_{3j} NatRes_i + \beta_{4j} Russian_i * NatRes_i + \beta_{5j} Ottoman_i * NatResi + \varepsilon_{ijt,t+5} \quad (2)$$

where $\Delta Transition_{ijt,t+5}$ captures the change in indicator $j$ between $t$ and $t+5$. We do so for the intervals covering 1989–1994, 1994–1999, 1999–2004, and 2005–2010. We assess whether early impacts from natural resources in the different empires are reversed in subsequent periods or whether such early impacts persist.

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### 4.2. Within-country regressions

Although the literature on the causes and impacts of cross-country differences in institutions has yielded a number of key insights, recent studies have highlighted this approach's limitations (see, for example, Pande and Udry, 2005). In the present paper, although we avoid instrumental variable estimation (which may be subject to violations of the exclusion restriction that are difficult to identify), we are limited in sample size to only the 27 transition countries present in our sample period. Moreover, one might still be concerned about country-level selection biases through which natural resource extraction may itself be correlated with underlying features that drive the transition experiences of different countries.

To validate the cross-country estimates, we therefore turn to within-country regressions that make use of individual-level data and allow us to control for country fixed effects, thereby addressing concerns about selection and omitted variables at the country level. We examine whether the heterogeneous response of transition to natural resources also manifests itself in different sub-national regions that were ruled by different empires. Eight of our sample countries experienced different empires ruling over distinct sub-national regions (see Table 1). Croatia, Hungary, Romania, Serbia and Ukraine had both Habsburg and Ottoman rule within their borders, with the addition of Russian rule for Ukraine. Poland, Lithuania, and Russia had Habsburg, Prussian and Russian rule within their borders. We therefore limit our analysis to these eight countries and examine the differences in effects among their sub-national regions.

To identify effects at the region-level, we turn to the LITS individual-level data, matching the sub-national regions in this data with the corresponding historical empire.

At the sub-national level, measures of transition are more challenging to construct (the EBRD Transition Indicators are only available at the national level). As explained in Section 3, we rely on two. The first directly measures the success of the transition process by the share of entrepreneurs and small and medium sized enterprises in the local economy. The second measure captures the respondent's perception of the corruption environment, under the assumption that such corruption correlates with broader institutional quality and transition progress. Using these two measures, we estimate the following specification:

$$\beta_4 Russian_{rc} * NatRes_c + \beta_5 Ottoman_{rc} * NatResi_{rc} + D_c + \varepsilon_{irc} \quad (3)$$

where $i$, $r$, and $c$ index individuals, sub-national regions, and countries, respectively, and $D_c D_c$ indicates country fixed effects. With sub-national variation, we thus compare the differential impact of natural resources in regions that were formerly part of the Habsburg or Prussian empires relative to the impact in regions that were part of the Ottoman and Russian empires. Because of the small number of countries (8), we do not cluster standard errors at the country level. We nevertheless correct standard errors for the presence of heteroskedasticity.

While representative at the national level, LITS data is not representative at the regional level, although it is unbiased. Results that rely on within-country variation should thus be interpreted with caution.

## 5. Results

### 5.1. Cross-country results

Table 2 lays out the results of our primary cross-country estimation, based on the specification in Eq. (1). In columns 1–3, our dependent variable is the average standardized score (z-score) for each country's transition indicators in 2000. We begin by examining the average effect of natural resources in the full sample (ignoring empire-specific effects). The result, shown in column 1, yields a small and insignificant effect of these resources on the average transition score. In column 2, we add empire-specific dummies, finding that Ottoman and Russian empire countries exhibit significantly lower transition scores. In column 3, we estimate the full specification in Eq. (1), interacting the empire dummies with the natural resource measure. We now find that the main effect of natural resources in Habsburg empire countries is positive and highly significant. The interaction terms on natural resources in Ottoman and Russian empires, meanwhile, are negative and significant. In Ottoman countries, the sum of these effects is weakly positive, while the sum of the effect in Russian countries is negative. Taken together, these results suggest disparate responses to natural resources across the former empires.

In columns 4–6 of Table 2, we conduct the same set of regressions using the average standardized transition indicators in 2010 rather than 2000. The results remain similar to those using the 2000 scores.

One might be concerned that the standardization involved in aggregating across the indicators may, with such a small sample, create cross-sectional dependence in our error terms. Thus, in columns 7–9, we instead use the sum of the un-standardized transition scores in 2000 rather than the mean of the standardized scores as our dependent variable. In columns 10–12, we use the sum of these scores in 2010. In both sets of estimations, we find results that are qualitatively similar to those in the prior columns.

Next, we investigate whether these effects differ across the dimensions of transition. In Table 3, we show the results of estimating Eq. (1) using the scores for the large privatization, small privatization, enterprise structure, and competition policy indicators in 2010 as our dependent variables. The effects on large privatizations (col. 1) are large, statistically significant, and disparate: natural resources improved progress on large privatizations in Habsburg countries, did not affect progress in Ottoman countries, and significantly weakened progress in Russian countries. The effects on small privatizations (col. 2) are

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**Table 2**
Cross-country results with aggregate transition scores. *Source*: EBRD, LITS, Euratlas (2003).

| Dependent variable | Average standardized transition indicator in 2000 | | | Average standardized transition indicator in 2010 | | | Sum of transition indicators in 2000 | | | Sum of transition indicators in 2010 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | [1] | [2] | [3] | [4] | [5] | [6] | [7] | [8] | [9] | [10] | [11] | [12] |
| Nat. res. and mining, 1989 | 2.68 | 10.86 | 184.15*** | −12.97 | −14.95 | 104.99*** | 0.66 | 6.09 | 125.69*** | −6.73 | −7.60 | 61.04*** |
| | [35.59] | [42.59] | [50.47] | [34.91] | [35.00] | [16.33] | [25.99] | [31.16] | [34.25] | [19.0] | [18.89] | [10.05] |
| Ottoman empire | | −10.75*** | −4.34 | | −4.33** | −0.56 | | −7.6*** | −3.37 | | −2.5** | −0.28 |
| | | [3.23] | [5.51] | | [1.62] | [1.97] | | [2.34] | [3.93] | | [0.90] | [1.10] |
| Russian empire | | −7.48*** | 6.57 | | −6.2*** | 3.86 | | −5.5*** | 4.35 | | −3.5** | 2.25 |
| | | [2.34] | [4.95] | | [2.06] | [4.02] | | [1.67] | [3.51] | | [1.12] | [2.15] |
| Ottoman*Nat. res. | | | −128.77** | | | −80.12*** | | | −86.25** | | | −46.30*** |
| | | | [59.09] | | | [19.69] | | | [40.99] | | | [11.56] |
| Russian*Nat. res. | | | −276.79*** | | | −201.5*** | | | −194.2*** | | | −114.8*** |
| | | | [85.70] | | | [67.92] | | | [61.08] | | | [35.70] |
| Observations | 27 | 27 | 27 | 27 | 26 | 26 | 27 | 27 | 27 | 27 | 26 | 26 |
| *R*-squared | 0.00 | 0.33 | 0.46 | 0.01 | 0.24 | 0.38 | 0.00 | 0.32 | 0.45 | 0.00 | 0.25 | 0.41 |

*** $p < 0.01$,
** $p < 0.05$,
* $p < 0.1$.

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**Table 3**
Cross-country results with disaggregated transition scores. *Source*: EBRD, LITS, Euratlas (2003).

| Indicator | Large privatization | Small privatization | Enterprise structure and governance | Competition policy | Foreign exchange and trade | Price liberalization | Banking reform | Securities reform |
|---|---|---|---|---|---|---|---|---|
| Year | 2010 | 2010 | 2010 | 2010 | 2010 | 2010 | 2007 | 2007 |
| | [1] | [2] | [3] | [4] | [5] | [6] | [7] | [8] |
| Nat. res. and mining, 1989 | 10.97** | 2.61 | 21.52*** | 21.94*** | 0.00 | 4.01 | 13.80 | 31.84** |
| | [4.64] | [2.28] | [6.38] | [5.60] | [0.00] | [2.37] | [12.71] | [13.19] |
| Ottoman empired | 0.17 | −0.35 | 0.03 | −0.04 | −0.19* | 0.11 | −0.28 | 0.21 |
| | [0.44] | [0.28] | [0.45] | [0.41] | [0.10] | [0.20] | [0.81] | [0.84] |
| Russian empire | 0.72 | 0.11 | 0.68 | 0.78 | −0.18 | 0.14 | 0.26 | 0.92 |
| | [0.55] | [0.34] | [0.55] | [0.58] | [0.50] | [0.37] | [0.79] | [0.82] |
| Ottoman ∗ Nat. res. | −8.36 | −3.24 | −17.99** | −15.04** | 1.17 | −2.84 | −8.97 | −25.12 |
| | [4.99] | [2.77] | [6.50] | [5.78] | [0.75] | [2.48] | [14.14] | [14.66] |
| Russian ∗ Nat. res. | −25.14*** | −10.12 | −32.11*** | −31.88*** | −7.99 | −7.54 | −20.93 | −33.05** |
| Nat. res. and mining, 1989 | [8.83] | [7.83] | [8.08] | [8.24] | [8.52] | [5.45] | [14.42] | [14.96] |
| Observations | 26 | 26 | 26 | 26 | 26 | 26 | 27 | 27 |
| *R*-squared | 0.31 | 0.27 | 0.57 | 0.50 | 0.24 | 0.15 | 0.35 | 0.46 |

*** $p < 0.01$,
** $p < 0.05$,
* $p < 0.1$.

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**Table 4**
Changes in cross-country indicators. *Source*: EBRD, LITS, Euratlas (2003).

| Indicator | Large privatization | | | | Small privatization | | | | Enterprise structure | | | | Competition policy | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Time period | 1989–1994 | 1994–1999 | 1999–2004 | 2005–2010 | 1989–1994 | 1994–1999 | 1999–2004 | 2005–2010 | 1989–1994 | 1994–1999 | 1999–2004 | 2005–2010 | 1989–1994 | 1994–1999 | 1999–2004 | 2005–2010 |
| *Panel A* | | | | | | | | | | | | | | | | |
| | [1] | [2] | [3] | [4] | [5] | [6] | [7] | [8] | [9] | [10] | [11] | [12] | [13] | [14] | [15] | [16] |
| Nat. Res. | 35.3** | −17.64 | −5.64 | 3.25 | 30.68 | −1.63 | −6.02 | −0.26 | 28.0** | −10.03 | −4.39 | 0.92 | 36*** | −12.75 | −3.40 | 1.79 |
| | [15.93] | [14.06] | [6.73] | [4.75] | [19.95] | [15.70] | [7.30] | [2.78] | [12.72] | [8.50] | [6.24] | [3.74] | [9.10] | [7.72] | [6.93] | [7.01] |
| Ottoman | 0.32 | −0.76 | 0.17 | 0.35 | −0.14 | −0.75 | 0.28 | 0.15 | 0.27 | −0.58 | 0.14 | 0.07 | 0.90 | −1.2** | −0.23 | 0.46 |
| | [1.02] | [0.90] | [0.43] | [0.30] | [1.27] | [1.00] | [0.47] | [0.18] | [0.81] | [0.54] | [0.40] | [0.24] | [0.58] | [0.49] | [0.44] | [0.44] |
| Russian | 1.39 | −0.73 | −0.03 | 0.11 | 2.04 | 0.04 | −0.32 | 0.06 | 0.85 | −0.17 | −0.31 | −0.04 | 1.28** | −0.25 | −0.27 | −0.05 |
| | [0.99] | [0.87] | [0.42] | [0.29] | [1.24] | [0.98] | [0.45] | [0.17] | [0.79] | [0.53] | [0.39] | [0.23] | [0.57] | [0.48] | [0.43] | [0.43] |
| Nat. Res. X Ottoman | −28.93 | 14.13 | 9.16 | −5.09 | −24.74 | 11.75 | 1.48 | −0.18 | −24.16 | 8.63 | 0.47 | 1.16 | −38*** | 23.1** | 0.95 | −0.97 |
| | [17.72] | [15.64] | [7.48] | [5.27] | [22.19] | [17.46] | [8.12] | [3.09] | [14.14] | [9.45] | [6.94] | [4.15] | [10.12] | [8.59] | [7.71] | [7.78] |
| Nat. Res. X Russian | −39** | 11.20 | 3.11 | −1.78 | −45.7* | 7.17 | 8.37 | 0.13 | −36** | 7.59 | 2.34 | 2.70 | −32*** | 6.36 | −0.81 | −3.19 |
| | [18.07] | [15.95] | [7.63] | [5.38] | [22.63] | [17.81] | [8.28] | [3.15] | [14.42] | [9.64] | [7.08] | [4.23] | [10.32] | [8.76] | [7.87] | [7.93] |
| Observations | 27 | 27 | 27 | 26 | 27 | 27 | 27 | 26 | 27 | 27 | 27 | 26 | 27 | 27 | 27 | 26 |
| *R*-squared | 0.39 | 0.12 | 0.49 | 0.09 | 0.39 | 0.18 | 0.22 | 0.15 | 0.49 | 0.22 | 0.28 | 0.25 | 0.65 | 0.38 | 0.22 | 0.45 |

| Indicator | Foreign exchange and trade | | | | Price liberalization | | | | Banking reform | | | Securities reform | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Time period | 1989–1994 | 1994–1999 | 1999–2004 | 2005–2010 | 1989–1994 | 1994–1999 | 1999–2004 | 2005–2010 | 1989–1994 | 1994–1999 | 1999–2004 | 1989–1994 | 1994–1999 | 1999–2004 |
| *Panel B* | | | | | | | | | | | | | | |
| | [1] | [2] | [3] | [4] | [5] | [6] | [7] | [8] | [9] | [10] | [11] | [12] | [13] | [14] |
| Nat. res. | 23.12 | −16.73 | −5.64 | 0.00 | −0.15 | −4.16 | −0.52 | −0.40 | 21.18 | 0.45 | −8.59 | 6.13 | 18.37* | 5.05 |
| | [28.73] | [22.53] | [9.30] | [3.46] | [22.53] | [16.95] | [7.64] | [3.03] | [14.34] | [11.56] | [7.92] | [9.52] | [10.21] | [6.50] |
| Ottoman | −0.98 | −0.61 | 0.46 | 0.29 | −1.87 | 0.03 | 0.89* | −0.01 | −0.18 | 0.01 | −0.02 | −1.22* | 0.95 | 0.53 |
| | [1.83] | [1.44] | [0.59] | [0.22] | [1.44] | [1.08] | [0.49] | [0.19] | [0.92] | [0.74] | [0.51] | [0.61] | [0.65] | [0.41] |
| Russian | 1.01 | −0.58 | −0.18 | −0.05 | 1.31 | −0.67 | −0.03 | −0.06 | 0.63 | 0.12 | −0.46 | −0.34 | 0.92 | 0.37 |
| | [1.78] | [1.40] | [0.58] | [0.21] | [1.40] | [1.05] | [0.47] | [0.19] | [0.89] | [0.72] | [0.49] | [0.59] | [0.63] | [0.40] |
| Nat. Res. X Ottoman | −5.92 | 14.04 | 0.87 | −1.61 | 17.78 | 3.14 | −5.56 | 0.28 | −17.29 | 0.67 | 6.16 | 3.21 | −22.46* | −5.75 |
| | [31.95] | [25.06] | [10.34] | [3.83] | [25.06] | [18.85] | [8.50] | [3.36] | [15.95] | [12.86] | [8.81] | [10.59] | [11.35] | [7.22] |
| Nat. res. X Russian | −41.80 | 20.54 | 10.73 | 1.67 | −17.16 | 13.81 | 1.67 | 2.94 | −32.08* | −2.02 | 11.08 | −4.04 | −22.09* | −6.51 |
| | [32.58] | [25.56] | [10.55] | [3.91] | [25.56] | [19.22] | [8.67] | [3.42] | [16.27] | [13.11] | [8.99] | [10.80] | [11.58] | [7.37] |
| Observations | 27 | 27 | 27 | 26 | 27 | 27 | 27 | 26 | 27 | 27 | 27 | 27 | 27 | 27 |
| *R*-squared | 0.25 | 0.08 | 0.25 | 0.29 | 0.35 | 0.07 | 0.40 | 0.19 | 0.43 | 0.01 | 0.16 | 0.51 | 0.21 | 0.13 |

*** p<0.01,
** p<0.05,
* p<0.1.

in the same directions but much smaller and not significant. The difference in effects across the size of the enterprises being privatized is consistent with the argument that natural resource rents are concentrated in large enterprises (with leaders then varying in their willingness to privatize such enterprises).

These concentrated rents are most directly controlled in state-owned enterprises via control over their corporate governance and entry into the sector. As a result, we expect that leaders in countries with weaker institutions but large natural resource sectors will maintain tight control over enterprise structure and competition, while those in countries with stronger institutions may be willing to liberalize these policies. Consistent with this line of reasoning, we find impacts on the enterprise structure (col. 3) and competition policy (col. 4) indicators that are similar in magnitude and significance to those on large privatizations. Again, larger shares of employment in the natural resource and mining sectors improve enterprise restructuring and competition policy in Habsburg countries, have little effect in Ottoman countries, and limit the transition in Russian empire countries.

At the same time, liberalization of trade and foreign exchange regimes, price controls, and the financial sector may be less directly related to natural resource rents (although there may be channels through which these are indeed linked). In Table 3, we find much smaller and insignificant impacts on the trade and foreign exchange (col. 5) and price liberalization (col. 6) indicators. The effects on banking reforms (col. 7) are larger but noisy, while the effects on securities reforms (col. 8) are quite large and significant. Again, because attempts to control natural resource rents may manifest themselves in diverse dimensions, one should not over-stress the differential effects of natural resources and empire histories on the various dimensions of reform. Nonetheless, these differences are generally consistent with these resources' varying impacts on transition due to leader's differing abilities to control them based on historically derived institutions.

We next explore whether these effects reflect persistent differences in transition trajectories by estimating Eq. (2). Panel A of Table 4 shows the results for changes between 1989 and 1994, 1994 and 1999, 1999 and 2004, and 2005 and 2010 for the large privatization, small privatization, enterprise structure, and competition policy indicators. In all of these cases, we find that the effects materialize only for the 1989–1994 period. From 1994 onwards, Ottoman and Russian empire countries do not exhibit any differential changes in any of the indicators. Furthermore, natural resource employment shares do not affect transition in any of the later periods (nor do they do so differentially for any of the empires). In some instances, the coefficients are of the opposite sign in the latter periods, but they are much smaller than in the first five year period and not statistically significant (indicating only limited reversal).

In Panel B of Table 4, we conduct the same analysis for the other policy indicators (foreign exchange and trade, price liberalization, banking reform, and securities reform). We again find large but noisy estimates for some of these indicators (as in the cross-sectional levels regressions in Table 3). The coefficients are again largest in the first five-year period for almost all cases. Only in the case of securities reform do we find a significant effects of natural resources and empires in the 1994–1999

**Table 5**
Cross-country robustness checks. *Source*: EBRD, LITS, Euratlas (2003).

| Dependent variable | Average standardized transition indicator in 2000 [1] | Sum of transition indicators in 2000 [2] | Average standardized transition indicator in 2000 [3] | Sum of transition indicators in 2000 [4] | Average standardized transition indicator in 2000 [5] | Sum of transition indicators in 2000 [6] | Average standardized transition indicator in 2000 [7] | Sum of transition indicators in 2000 [8] |
|---|---|---|---|---|---|---|---|---|
| Nat. res. and mining, 1989 | 260.47 | 179.44 | 301.99* | 206.68 | 293.08 | 200.40 | 40.88 | 22.88 |
| | [205.81] | [152.06] | [163.79] | [120.11] | [185.49] | [135.94] | [88.07] | [64.30] |
| Ottoman empire | −0.13 | −0.33 | −1.27 | −1.13 | 8.28 | 5.97 | | |
| | [9.27] | [6.85] | [7.41] | [5.44] | [20.85] | [15.28] | | |
| Russian empire | 7.42 | 4.94 | 10.88 | 7.38 | 8.78 | 5.90 | | |
| | [9.09] | [6.72] | [7.56] | [5.54] | [8.39] | [6.15] | | |
| Ottoman * Nat. res. | −207.11 | −141.28 | −214.09 | −144.60 | −609.40 | −438.97 | | |
| | [221.30] | [163.51] | [180.96] | [132.69] | [698.13] | [511.67] | | |
| Russian * Nat. res. | −381.17 | −268.37 | −448.17** | −314.23** | −436.63* | −306.09* | | |
| | [228.92] | [169.14] | [188.19] | [138.00] | [213.07] | [156.16] | | |
| Ln GDP per capita, 1990 | 2.17 | 1.46 | | | | | | |
| | [2.25] | [1.66] | | | | | | |
| Life expectancy, 1990 | | | 0.67 | 0.47 | | | | |
| | | | [0.49] | [0.36] | | | | |
| EU member dummy | | | | | | | 12.61** | 8.84** |
| | | | | | | | [4.53] | [3.30] |
| EU member * Nat. Res. | | | | | | | −51.80 | −30.51 |
| | | | | | | | [108.45] | [79.18] |
| Observations | 23 | 23 | 26 | 26 | 26 | 26 | 28 | 28 |
| *R*-squared | 0.50 | 0.49 | 0.52 | 0.51 | 0.48 | 0.47 | 0.58 | 0.58 |

***$p < 0.01$.
** $p < 0.05$.
* $p < 0.1$.

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**Table 6**
Within-country regressions. *Source*: EBRD, Grosjean and Senik (2011), LITS, Euratlas (2003).

| Dependent variable | Market development | | | | Economic situation better than in 1989 | | | |
|---|---|---|---|---|---|---|---|---|
| | [1] | [2] | [3] | [4] | [5] | [6] | [7] | [8] |
| Ottoman empire | 0.13*** | 0.15*** | 0.16*** | 0.15*** | 0.36 | 0.31 | 0.40 | 0.54 |
| | [0.03] | [0.03] | [0.03] | [0.03] | [0.58] | [0.59] | [0.59] | [0.58] |
| Russian empire | −0.10*** | −0.10*** | −0.10*** | −0.09*** | −2.29*** | −2.26*** | −2.23*** | −2.24*** |
| | [0.03] | [0.03] | [0.03] | [0.03] | [0.42] | [0.42] | [0.42] | [0.42] |
| Nat. res. | 1.52** | 1.75*** | 1.78*** | 1.70*** | −16.59*** | −17.25*** | −17.87*** | −16.08*** |
| | [0.62] | [0.63] | [0.62] | [0.62] | [6.21] | [6.38] | [6.34] | [6.22] |
| Ottoman*Nat. res. | −2.86*** | −3.18*** | −3.29*** | −3.09*** | 4.43 | 5.20 | 4.13 | 0.71 |
| | [0.63] | [0.63] | [0.63] | [0.63] | [14.43] | [14.63] | [14.57] | [14.39] |
| Russian*Nat. res. | −1.28* | −1.47** | −1.55** | −1.50** | 41.60*** | 42.34*** | 41.81*** | 40.00*** |
| | [0.66] | [0.66] | [0.66] | [0.66] | [9.15] | [9.29] | [9.28] | [9.16] |
| Demographic controls | | Y | | | | Y | | |
| Income controls | | | Y | | | | Y | |
| Respondent ever a member of the Communist Party | | | | −0.01 | | | | −0.09 |
| | | | | [0.01] | | | | [0.26] |
| Country fixed effects | Y | Y | Y | Y | Y | Y | Y | Y |
| Observations | 7,980 | 7,976 | 7,933 | 7,911 | 8,000 | 7,996 | 7,953 | 7,931 |
| *R*-squared | 0.25 | 0.25 | 0.26 | 0.25 | 0.12 | 0.12 | 0.14 | 0.13 |

Robust standard errors. Demographic controls: respondent gender, number of adults in household, religion dummies, and rural/urban residence. Income controls: per capita monthly total household expenditure, dummies for highest educational level completed by respondent, self-rating on 10-step economic ladder, and dummies for most important income source type.
*** $p < 0.01$.
** $p < 0.05$.
* $p < 0.1$.

period, with the interaction of natural resources and Ottoman and Russian empire dummies significant at the 10% confidence level. There is again limited evidence of reversal or catch-up effects post-1994. Together with the results in Panel A, these indicate that much of the variation in transition indicators across countries in 2010 can be explained by the countries' experience in the first five years, and this experience was driven by these countries natural resources and historical empires.

### 5.2. Cross-country robustness checks

We conduct a number of checks to ensure our results are in fact due to the heterogeneity in response to natural resources and not to either omitted factors or outlier observations.

Table 5 shows the results of these tests. We begin by controlling for the natural log of GDP per capita in 1990 while using as our dependent variable the average standardized transition score in 2000 (col. 1) and the sum of the transition indicators (col. 2). We find that the sign and magnitude of the effects do not vary dramatically from our baseline specification (if anything, the magnitudes are larger) but the standard errors rise, making the results insignificant. When we conduct the same set of regressions using life expectancy in 1990 as our control in place of GDP per capita (cols. 3 and 4), we find effects that are even larger in magnitude and which largely remain statistically significant.

One might rightfully be concerned that with such a small sample, a few influential observations can vastly alter the results. To check whether this is the case, we conduct a DFFITS analysis following Kennedy (2008, p. 379). We compute the normalized change in the main specification estimates for each of the aforementioned dependent variables that result from dropping each country in turn. Comparing each country's DFFITS statistic to the relevant critical value, we find that Romania is a notably influential observation. We therefore drop Romania from the sample in columns 5 and 6 of Table 5, finding that the effect of natural resources in formerly Ottoman countries is now much larger but noisier. That is, Romania's large natural resource sector (which accounted for 10.1% of employment in 1989) and relatively high transition scores (sum of 24.3 in 2000) actually counter the negative correlation between these variables found in other Ottoman countries.

Finally, we also consider whether the empire histories are merely proxies for other contemporary factors which drive the differential transition experiences. In particular, we test whether the effects we detect are due to European Union membership rather than the specific empires, as all former Habsburg countries have entered the EU but fewer former Ottoman and Russian empire countries have done so. We substitute a dummy for EU membership in place of the empire-specific dummies and test whether the interaction of natural resources with EU membership is significant (cols. 7 and 8 of Table 5). We find a much weaker effect, with the interaction term not significantly different from zero.

### 5.3. Within-country results

Table 6 lays out the results of our within-country estimation, based on the specification in Eq. (3). In columns 1–3, the dependent variable is the share of entrepreneurs and small and medium sized enterprises in the economy. In columns

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4–6, the dependent variable is the prevalence of corruption in local public services. For each dependent variable, we check that our results are robust to controlling for local demographic (columns 2 and 6), economic (columns 3 and 7) and political characteristics (columns 4 and 8).

Our within-country results on the success of economic and political transition in the real local economy are consistent with the cross-country results discussed so far on the broad indicators of transition. In the former Ottoman and Russian provinces of a given country, the presence of natural resources is systematically associated with worse economic transition outcomes than in the former Habsburg or Prussian regions of the same country. Even though, all else constant, the share of small and medium sized enterprises tends to be higher in former Ottoman regions, the influence of the share of regional employment in the natural resource sector in 1989 more than eliminates this advantage. Former Russian regions, on average, lag behind former Habsburg or Prussian regions and this is aggravated in regions where the share of the natural resource extraction industry was higher in 1989. The effects are robust to controlling for the demographic economic, and political make-up of the different regions. At the sample mean, the share of the natural resources sector in 1989 is associated with a nearly 3% lower share of small and medium sized enterprises and entrepreneurs today in former Ottoman regions, and a 2% lower share in former Russian regions, compared with Habsburg or Prussian regions.[7] We also run individual regressions for each of the nine countries. The effects are particularly robust in Hungary and Serbia (Ottoman vs. Habsburg) and in Ukraine (Ottoman and Russian vs. Habsburg).[8]

Former Russian regions that had a high share of the natural resource extraction industry in 1989 also experience endemic corruption in public services today. At the sample mean, the share of the natural resources sector in 1989 is associated with 13% higher prevalence of corruption in the former Russian provinces of a given country.[9] Again, we run individual regressions for each of the nine countries and we find that the effect is particularly strong in Ukraine. The prevalence of corruption in former Ottoman regions, by contrast, is not statistically different than former Habsburg regions, regardless of the regional industrial composition in 1989. This last result contrasts with Becker et al. (2011), but is explained by the fact that we consider all public services while they only consider courts and the police. If we, like them, restrict our attention to the corruption of courts, we also find a negative influence of Ottoman vs. Habsburg heritage combined with the presence of natural resources. When we consider the corruption of courts as a dependent variable, the coefficient on the interaction term between Ottoman legacy and the share of natural resource extraction sector in 1989 is 0.76 with a standard error 0.15 (significant at the 1% level). Following their approach, we also check whether popular trust in courts is also lower, which would be a natural consequence of higher prevalence of corruption. Regression results confirm that popular trust in courts is statistically significantly lower (at the 5% level) in former Ottoman regions that had a higher share of natural resource in 1989.[10]

## 6. Conclusion

This paper finds that the combination of deeply rooted determinants of institutional quality and the concentration of the natural resources and mining sector at the start of transition explains a large part of the variation in the success of economic and political transition, both across and within former communist countries in Europe and Central Asia. While countries and regions that inherited better institutions from former Habsburg or Prussian empires were able to harness natural richness and achieve better political and economic transitional outcomes, the effect was opposite in regions and countries of the former Ottoman and Russian Empires. The underlying mechanism that our results suggest is that economic and political elites who control large and concentrated rents in the natural resource sector opposed liberalization reforms that could erode their rents; and that their propensity and ability to do so depended on the quality of institutions whose foundations go back centuries. Consistent with this, we find that the effects are particularly strong for reforms in large-scale privatization, enterprise restructuring and competition policy. This pattern is consistent with Guriev and Rachinsky (2005), who observe that oligarchs in Russia are active reformers in some dimensions, such as lowering taxes, but push for conserving the rules of the game that benefit them. We also observe 'real' local effects from such a lack of reforms. In former Ottoman and Russian provinces of a given country where the share of the natural resource sector was larger in 1989, the share of entrepreneurs and small medium sized enterprises is lower today, compared with former Habsburg and Russian regions, even within a given country. The prevalence of corruption is also much higher.

A particularly disheartening result of our analysis is that much of the pattern we described was crystallized in the first few years of transition. Countries seem to be trapped in different paths that were taken at the start of transition. Even EU membership is not found to have had a significant effect in altering these patterns—or at least, not yet. If changing history is impossible, only altering the power dynamics and management of natural resources would change the pattern we have described in this paper.

[7] These numbers are computed by multiplying the coefficients obtained on the interaction term by the average share of the natural resource and mining sector in 1989 in the relevant region and dividing by the sample mean. In the former Ottoman regions, we obtain: $-21.145 * 0.0355/2.73 = -2.79\%$ and in the former Russian regions: $-1.41 * 0.036/2.73 = -1.86\%$.

[8] The results of regression in each individual country are not reported here for economy of space.

[9] Computed as $45.064 * 0.036/12.65$.

[10] The results are not displayed here but are available upon request.

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